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Department of Agronomy

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POULTRY LITTER AS A NITROGEN SOURCE FOR CORN

Monroe Rasnake and Larry Reber

Development of an intensive poultry production industry in western and south-central Kentucky will make poultry litter available to many farmers. It is estimated that 45,000 tons per year will be produced just in the Jackson Purchase Area. One of the most efficient uses of this litter is as a nitrogen fertilizer source for corn.

Poultry Litter consists of a bedding material such as saw dust, wood shavings and rice hulls mixed with poultry manure. It will contain an average of about 20% moisture and 55 pounds of nitrogen, 50 pounds of phosphate and 40 pounds of potash per ton. These figures vary considerably; therefore, litter should be tested to determine the actual nutrient content.

The value of nutrients contained in poultry litter can be estimated by comparing with the cost of commercial fertilizer. For example, using the average figures mentioned previously, and nutrient costs per pound of 20¢ for nitrogen, 20¢ for phosphate and 12¢ for potash, litter would be worth \$25.80 per ton. However, it should be remembered that not all of these nutrients will be available to the crop the first year. For example, because most of the nitrogen is in the organic form, only about 60% will be available the first year. About 20% will be

lost to leaching, denitrification, etc. Very little of the phosphorus and potassium will be lost, but about ¼ will not be available the first year. The fertilizer value during the application year could be calculated at about \$18 per ton for this example.

Field trials were conducted in 1991 and 92 with corn in Hickman County comparing poultry litter to commercial fertilizer. In 1991, 175 lbs N/A from ammonium nitrate fertilizer was compared with four and eight tons of broiler litter per acre on no-till corn. The treatments were surface-applied shortly after the corn was planted and not incorporated. The two litter treatments were calculated to supply 100 and 200 pounds of available nitrogen per acre. Yields (Table 1) were

Table 1. Corn Yield Response (bu/a) to Fertilizer Nitrogen and Poultry Litter

<u>1991 No-Till</u>		<u>1992 No-Till</u>	
175 lb N/A	97	3T Litter	119
4T Litter	87	6T Litter	145
8T Litter	83	9T Litter	138
<u>1992 Conventional Till</u>			
150 lb N/A			138
4T Litter			160
8T Litter			163

low due to dry weather and the litter treatments were not as good as nitrogen fertilizer. It appeared that there was not enough moisture to decompose the surface-applied litter and move the nutrients into the soil. Some nitrogen was probably lost through ammonia volatilization.

Moisture conditions were much better in 1992 as reflected by corn yields. In the no-till plots, three tons of litter per acre did not provide enough nitrogen. This was calculated to be 60 lbs N/A available to the crop. The highest yield was obtained with six tons of litter (120 lbs N) per acre. Somewhere between three and six tons per acre may have been best. In the conventional till plots, four tons of litter (120 lbs N) per acre was best. It appears that some of the fertilizer nitrogen was lost or was not available when the plants needed it most. Some nitrogen was not used by the crop with the eight tons of litter (240 lbs N) per acre. This could contribute to groundwater pollution due to leaching during the winter.

These results show that poultry litter is a good source of nitrogen for growing corn. It appears that about four tons of litter per acre will supply enough nitrogen; however, litter testing is the only way to be sure how much nitrogen is being supplied. Surface applications are less efficient than mixing with the soil - especially in dry years. In situations where large applications of phosphate and potash are not needed, it may be better to use lower rates of litter and use fertilizer to supply some of the nitrogen. This would better utilize nutrients in the litter and reduce the risk of water pollution.

More information on the use of poultry litter is available from your county Extension Agent for Agriculture.


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